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CUSTOM CUT IMAGE PRODUCTS

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CUSTOM CUT IMAGE PRODUCTS

FIELD OF THE INVENTION

The invention relates to remote a system and method for producing custom cut image products by the average consumer.

5 BACKGROUND OF THE INVENTION

Applying pressure sensitive adhesive and release sheets to the back sides of photographs to generate "sticker prints" is well known. Typically, these sticker prints are die cut with a fixed format die cutter. With the advent of "Internet Photofinishing", consumers can view, edit, zoom, crop, correct red-eye, make color/density adjustments and many other image adjustments, on-line before the digital images are printed. In addition, consumers can select a finished print size from a list of fixed print sizes.

Digital cutters such as the CM-300 30" Pro Series Vinyl Cutter sold by Roland DGA Corporation, used to make custom cut signage from computer files, can be programmed to any shape or pattern. This system typically uses complex image manipulation software such PhotoShop® by Adobe Systems to produce custom image products. This equipment is also operated by skilled individuals, is expensive and requires routine maintenance such as positioning calibration and knife replacement. Additionally these digital cutters require adjustments to compensate for the various media types that are being cut and are not designed to automatically handle numerous media types. There is currently no Internet Photofinishing service that offers the unskilled average consumer prints that are custom cut to the average consumers' requirements.

It is also known to create "Scrap Books" by cutting photographs into various shapes with scissors and razor knives, applying glue and pasting them into books has become a popular way to preserve and present personal photographic images. This procedure is time consuming, expensive, requires an array of tools and materials, is limited by the skill of the user/consumer and is potentially hazardous because of the use of unfamiliar sharp implements on various print materials of different compositions. It is desirable to provide a choice of cut shapes from fixed, freeform and image derived without requiring a

operator or an expensive investment in time, tools and materials. It is toward this end that the present invention is directed.

- It is therefore desirable to provide system and method that allows an unskilled user the option to select and indicate how a final print will be cut without the extensive skill required to use complex image manipulation software and at a relative low cost.
- 5

SUMMARY OF THE INVENTION

- In accordance with one aspect of the present invention there is provided a method for obtaining custom cut image products by an unskilled user, comprising the steps of:
- 10

the user identifying a subject within a digital image for producing a cut image product at a first location;

automatically differentiating the selected subject from the background;

- 15 placing an order over a communication network to a production facility at a second location that is remote from the first location for producing a cut image product using the selected subject

printing an image of the selected subject on a sheet of media; and
producing the cut image product from the sheet of media

- 20 incorporating the selected subject.

These and other aspects, objects, features and advantages of the present invention will be more clearly understood and appreciated from a review of the following detailed description of the preferred embodiments and appended claims and by reference to the accompanying drawings.

25 BRIEF DESCRIPTION OF THE DRAWINGS

In the detailed description of the preferred embodiments of the invention presented below, reference is made to the accompanying drawings in which:

- Fig. 1 is an illustration of a system for producing custom cut image products in accordance with the present invention;
- 30

Fig. 2a is a plan view of an image from which a subject is to be extracted;

Fig. 2b a view similar to Fig. 2a illustrating the subject identified by an outline;

Fig. 3c illustrates the identified subject as to how it would be viewed on a display device;

5 Fig. 3a is a view similar to Fig. 2a;

Fig. 3b is a view similar to Fig. 3a illustrating a fixed pattern for identifying a subject;

Fig. 3c shows the fixed pattern of Fig. 3b separated from the background of the image;

10 Fig. 3d shows a view of what the cut image product produced from the image of 3c would look like;

Figs. 4a-4c illustrates several examples of fixed patterns;

Fig. 5 is an operational flowchart of the system of Fig. 1;

Fig. 6a is a plan view of an image that is to be made into a cut

15 image product;

Fig. 6b is an exploded view of the image product of Fig. 6a made into a puzzle;

Fig. 7a is a plan view of a display of subject and supporting stand that is to be made in a cut image product according to the present invention;

20 Fig. 7b is a view similar to Fig. 7a showing the supporting stand as a part of the cut image product; and

Fig. 7c is plan view of a cut image product made from the subject of Figs. 7a and 7b.

DETAILED DESCRIPTION OF THE INVENTION

25 Referring to FIG. 1, there is illustrated a diagram of a system 10 made in accordance with the present invention for producing custom cut image products. The system 10 includes custom cut image products, production facility 12, which can be accessed over a communication network 14 through a computer/server 16 located at facility 12. In the particular embodiment illustrated,

30 the communication network 14 comprises the Internet, which is accessed through an Internet Service Provider (ISP) 18. The facility includes a digital printer 20 for printing of images on media 22. The custom cut image products production

facility 12 also includes a cutting device 24 that is operably connected to server 16 for cutting of the media 22 along designated paths.

As illustrated, system 10 also includes a remote ordering site 30 for ordering of goods and/or services from facility 12. In the particular embodiment
5 illustrated, the remote ordering site 30 comprises a user having a computer 32 including a display device 44 which is capable of communicating over the Internet 14 through ISP 34. A digital camera 36 and image scanner 38 are connected to computer 32 for obtaining digital images. Image scanner 38 can include capabilities to scan photographs, slides, film negatives and other forms of printed
10 material. Remote ordering site 30 may be a private home, public facility or retail outlet and computer 32 may be a private personal computer or public kiosk such as a Kodak Image Magic Enhancement Station manufactured by the Eastman Kodak Company. Images may be provided to computer 32 from digital camera 36 or image scanner 38 or by any other source. In addition, it is common practice for
15 users to access images stored at remote locations such as with the "You've Got Pictures™" service provided by America Online and the Eastman Kodak Company.

Digital image files, which represent images and provided are via remote ordering site 30 can be transferred to server 16 over the Internet 17 via
20 ISPs 18, 34. Algorithms at computer 32 or server 16 may be used to extract a subject 42 from the background of an image. Fig. 2a illustrates an image 41 from which the subject 42 to be extracted. The algorithm may be applied to the full resolution image 41 or a surrogate, lower resolution image. The result of the subject extraction algorithm is displayed on the display device 44 (See FIG. 1) of
25 computer 32 as shown by Fig. 2b. In one method of identifying the subject 42, an outline 43 of the subject 42 is displayed as illustrated by Fig. 2c. The user can indicate the subject 42 by any of the following methods including: manually tracing around the edge of the subject, point to point connection of dots and lines around the subject, key point indication and automated subject extraction. The
30 custom cut pattern indicia (outline) 43 would be visible around the subject 42. When the user verifies the selection of the custom cut pattern indicia 43, the subject 42 is removed from background 45. The user verifies that the subject 42

has been extracted correctly or can reapply the extraction algorithm, select a different extraction method, modify the parameters of the extraction algorithm or manually edit the subject extraction.

- Once the extracted subject 42 is obtained, it can be replicated
- 5 and/or resized depending on the image product(s) desired by the consumer. The subject 42 can be made to fit the size of the media on which it is to be printed, scaled to a selected size or printed as many times as desired on a single or plural number of sheets. The extracted subject 42 is printed using a digital printer 20 producing digital print 22.) Digital printing technology can include but is not
- 10 limited to; a digital photographic printer such as the Kodak Digital Science LF CRT color printer, a thermal dye-sublimation printer such as the KODAK PROFESSIONAL 8670 PS Thermal printer and inkjet printer such as the KODAK Personal Picture Maker 120 by Lexmark or an integrated printer/cutter such as the ColorCAMM PRO Model PC-60 sold by the Roland DGA
- 15 Corporation. In addition to the extracted subject 42, the user could have the option to select other pre-extracted subjects or clip art, not shown, to add to the digital print 22. Digital print 22 is sent to digital cutter 24 where it is cut in accordance with the instructions or desires of the customer. An example of a suitable printer is the "CX-12", a 12" wide Desktop vinyl Cutter sold by Roland
- 20 DGA Corp. Since the location of the printed image is known from the information provided to digital printer, the cutter is able to cut the media at predetermined locations so as to form cuts in a predetermined pattern, for example, along the outline of the printed subject. Optionally, a machine readable indicia can be printed on the media 22 by the printer 20 that can be read by cutter
- 25 24. The cutter can then use this indicia as a position means for determining placement of the cuts. The cuts provided may be completely around the printed subject or just partially along the outline so as to allow the image to be easily removed from the media.

- It is to be understood that printing of the images may be done on a
- 30 variety of media types, for example, but not limited to: plain paper; an adhesive backed media comprising a printing layer having a printing side and back side and base layer; a media having a printing base layer and base layer that may comprise

of a flexible magnetic layer, a static cling layer or a transparent base; an image receiving heat shrink film layer and a heat shrink base layer. If an adhesive backed media is used the resulting cut digital print 22, is cut in such a way that the image media is cut and the adhesive release layer is not so as to facilitate removal of the cut adhesive backed print. Cut digital print 22 is placed in a package 52 for delivery the customer at site 30 or any designated location. If the originating location is a retail outlet, payment can be made to the retailer when the custom image product 22 is picked up by the customer. If the originating location 30 is a private home or a public location like a public library, payment can be made at the time the custom cut product is ordered, via credit card or C.O.D. whichever is appropriate.

While in the illustrated embodiment, separate printing and cutting devices are disclosed, the functions of the digital printer 22 and digital cutter 24 can be integrated with a single unit as with the "ColorCAMM PRO Model PC-60", sold by Roland DGA Corp..

Fig. 3a is an illustration of image 60 from a digital image file having a subject from which a fixed pattern custom cut image product is to be made. The image 60 comprises an image subject 62 and background 64 which would be displayed on the computer display device 44. The user would select fixed cut pattern indicia 66 and place it around image subject 62. Fixed cut pattern indicia 66 can be any shape or size and can be scaled to fit image subjects of any size. Figs. 4a, 4b and 4c illustrate but a few examples of various shapes the cut pattern indicia 66 may take. When positioned correctly the user verifies the selection and the fixed cut pattern indicia 66 including the image subject is removed from background 64. The resulting custom cut print via fixed cut pattern indicia 66 is produced as illustrated by Fig. 3d.

Fig. 5 is an operational flowchart 80 of a method according to the present invention. The method starts with select image step 82 where the user chooses an image file to obtain a subject that is to be used to make a custom cut image product. Selection step 82 requires the user to visually identify the subject on the computer display device 44. The user indicates, via a standard input device such as a mouse or a touch screen, the subject's eyes, a rough outline or the edge

of the subject. PhotoShop® 6.0 by Adobe Systems Incorporated provides a software tool such as a "Smart Lasso" to assist the user in defining the subject 62 from the background 64. In the case where an image is generated with a chroma key system, such as the "Holoset" system by Play Incorporated, the subject 62 can
5 be automatically removed from the background without initial intervention from the user. A similar technique can be used with "subject only" physical items such as sporting or entertainment tickets, greeting cards or other printed matter and memorabilia where the entire printed object is the subject. The item can be scanned with a print/document scanner, such as KODAK DIGITAL SCIENCE
10 PhotoDoc Color Scanner, sold by the Eastman Kodak Company, to automatically obtain a subject without a background.

At step 86, the file of the subject is submitted to the subject identification algorithm to augment the manually input information provided by the user. The subject's edges are estimated at step 88. At step 90, the display
15 image with a visible outline is presented to the user on the computer display device 44.

At decision step 92, the user verifies that the outline is acceptable. If required, the user modifies the outline at step 94 and then goes back to step 86 for resubmission. When the outline is acceptable, the user then does any desired
20 manipulation of the subject and orders goods and/or services starting at step 96. At step 96, the customer confirms purchase and/or payment method. At step 98, the server 16 performs any necessary manipulation and/or calculation such as vector analysis of the selected subject. At step 100, the data from step 98 is stored on server 16. At step 102, image enhancements or further image manipulation
25 occurs. Once this is completed by server 16, the image is stored at step 104. As appropriate, the image at step 106 is sent to the printer 20 for printing. At step 108, the media 22 received from printer 20 is placed in cutter 24. The media 22 at step 110 is aligned in the cutter 24. This alignment can be used so as to locate the image on the media 22 for proper placement of the cuts by cutter 24.
30 Alternatively, as previously discussed, an indicia can be read by cutter 24 that can also be used for location of the subject for cutting at the desired locations. At step 112, the appropriate data from server 16 is obtained by cutter 24 and at step 114 is

used to conduct the cutting operation at the predetermined locations. Finally, the cut media XX at step 116 is forwarded to the user designated location.

- Because many different types of custom cut products can be created from different media and digital printing techniques, the workflow at the production facility 12 is important for minimizing the cost to facility 12. In addition, the user requires that the correct product type, which has been properly cut, be delivered in a timely manner at a reasonable cost. Altering the digital cutter settings for cut depth, cut pressure and cut speed to accommodate different media types for each individual order received, would interfere with the productivity and workflow and would induce errors into the system resulting in waste and potential damage to the equipment. Therefore in order to maximize the productivity of the production facility, batching of similar type orders are done so that similar media type print orders are processed together with the proper digital cutter settings. Another method for minimizing cost and/or improving efficiency of the system involves having a number of digital cutters each set to process an individual media type and cutting parameter. Alphanumeric eye readable and/or machine identification codes can be printed on a non-image area of the digital print. This code could be read by the cutter to assure that the digital print is cut with a cutter set to the proper setting and also can be used to assure that the proper custom cut image product is delivered to the proper location. Various digital media types that may be utilized at facility 12, include but are not limited to the following: Inkjet Shrink Film sold by Royal Brites, a Mafcote Company to make personalized ornaments, pins and toys; Inkjet Window Decals sold by Royal Brites; A Mafcote Company a transparency material with a tacky, semi-adhesive layer and release layer to attach the print to windows; and Inkjet Magnetic Paper sold by Royal Brites, A Mafcote Company for making prints that attach to ferrous metal surfaces; Inkjet Photo Stickers sold by Eastman Kodak Company an inkjet print material with an adhesive layer and release layer; and Thermal dye sublimation sticker prints such as 4700 Photo Printer Media Kit by Eastman Kodak Company.

In FIG. 6a, there is an illustration of a media 101 that is to be made into the form of a puzzle 111, as shown by Fig. 6a with an image subject 103 and

background elements 105. In addition to the primary image subject 103, additional scene elements 107 can be defined in the same way as the primary image subject 103. For a content derived puzzle 111, the primary image subject 103 and additional scene elements 107 can be cut to form custom cut image
5 subject puzzle piece 113 and custom cut scene element puzzle pieces 115. For the remaining background elements 105 that have no discrete large objects, this area can be randomly cut to form random cut puzzles pieces. The media for constructing custom cut content derived puzzles may be integral magnetic media or magnetically backed print media or any suitable heavy stock digital print
10 media.

Referring to FIGS. 7a-7c, there is illustrated a content derived freestanding custom cut image product 200 which in the embodiment illustrated is a custom cut paper doll stand. Image product 200 is created in the form of the extracted subject 202 that has been altered by the addition of digitally generated
15 paper doll stand 206. Paper doll stand 206 may also be integrally formed with the subject 202. The product 200 may be placed into the proper position manually by the user using a pointing device or automatically positioned by an algorithm. In order to form the support sections 204 of the paper doll stand 206, pre-scored or digitally printed fold lines 208, are added. A score line 210 can be created with a
20 digital cutter with a perforation pattern instead of a contiguous cut for removing of the designated subject from media 22. In addition dulled knives can be used in the digital cutter to create a score line to facilitate folding for custom cut image products such as origami models, folded greeting cards or boxes and other formed containers and shapes.

25 Other custom cut image products include stencils, silhouettes, magnetic or adhesive frames, speech/thought bubbles, greeting cards and origami. In order to entice or inform the user of the availability of the array custom cut images product options that are available, these options can be presented on the user's computer monitor after the subject has been extracted.

30 It is to be understood various changes and modification may be made without departing from the scope of the present invention, the present invention being defined by the claims set forth herein.

PARTS LIST

10	System
12	Production facility
14	Communication network
16	Computer/Server
17	Internet
18	Internet Service Provider (ISP)
20	Digital printer
22	Media/digital print
24	Digital Cutter
30	Remote ordering site
32	Computer
34	Internet Service Provider (ISP)
36	Digital camera
38	Image scanner
41	Image
42	Subject
43	Outline/Custom cut pattern indicia
44	Display device
45	Background
60	Image
62	Image subject
64	Background
66	Fixed cut pattern indicia
80	Flowchart
82	Step
86	Step
88	Step
90	Step
92	Step
94	Step
96	Step

98	Step
100	Step
101	Media
102	Step
103	Image subject
104	Step
105	Background elements
106	Step
107	Scene elements
108	Step
110	Step
111	Puzzle
112	Step
113	Custom cut image subject puzzle pieces
114	Step
115	Custom cut scene element puzzle pieces
116	Step
200	Image product
202	Extracted subject
204	Support sections
206	Paper doll stand
208	Pre-scored/Digitally printed fold lines
210	Score line